DATA EVALUATION RECORD
AQUATIC INVERTEBRATE LIFE CYCLE TEST
§ 72-4(c) b

1. **CHEMICAL:** Fenamidone Technical — PC Code No.: 046679

2. **TEST MATERIAL:** EXP/RPA 407213 Technical — Purity: 99.2%

3. **CITATION:**

Authors: Lima, W.

Title: RPA 407213 - Life-Cycle Toxicity Test with Mysids (*Mysidopsis bahia*).

Study Completion Date: May 17, 2000

Laboratory: Springborn Laboratories, Inc.
790 Main Street
Wareham, MA 02571-1075

Sponsor: Rhone-Poulenc AG Company
P.O. Box 12014, T.W. Alexander Drive
Research Triangle Park, NC 27709

Laboratory Report ID: 10566.6551

MRID No.: 45385723

DP Barcode: D275213

4. **REVIEWED BY:** Christie E. Padova, Staff Scientist, Dynamac Corporation

Signature: C.E. Padova **Date:** 2/15/02

APPROVED BY: Teri Myers, Ph.D., Staff Scientist, Dynamac Corporation

Signature: [signature] **Date:** 2/15/02

5. **APPROVED BY:** [redacted] James J. Goodyear, Ph.D.
US EPA, Mail Code 7507C
1200 Pennsylvania Ave. NW
Washington, DC 20460

Signature: James J. Goodyear **Date:** 4/30/2

6. STUDY PARAMETERS:

Scientific Name of Test Organisms: *Americamysis bahia*

Age of Test Organism: ≤24 Hours old

Definitive Test Duration 28 days

Study Method: Flow-through

Type of Concentrations: Mean-measured

7. CONCLUSIONS:

In this 28-day life cycle toxicity test, *Mysidopsis bahia* neonates were exposed under flow-through conditions to RPA 407213 Technical (99.2% purity) at mean-measured concentrations of 0 (negative control), 0.0014, 0.0027, 0.0052, 0.0095, 0.019, and 0.040 mg a.i./L. Measured values were 79-94% of the 0.0015, 0.0029, 0.0058, 0.012, 0.023, and 0.047 nominal concentrations. Each treatment group consisted of 60 mysids/level.. Following sexual maturity on Day 14, 20 pairs per treatment level were isolated for the remainder of the study. First-generation mysids were observed for mortality and signs of abnormal behavior once daily throughout the study. Once daily during the reproduction period, second-generation mysids were counted, then discarded. Data endpoints included survival of first-generation mysids (Day 28; combined sexes), number of young produced per female per reproductive day, and dry weight and length of surviving first-generation mysids (Day 28; sex-specific).

Survival of first-generation mysids was not impaired, and ranged from 82-95% for the treatment groups compared to 87% for the control group.

Reproductive success (offspring/female/day), the most sensitive endpoint, was significantly impaired 76% and 100% at the two highest treatment levels, 0.019 and 0.04 mg a.i./L. Reproductive success was 1.92, 1.78, 1.86, 1.76, 1.53, 0.453, and 0.0073 for the control, 0.0014, 0.0027, 0.0052, 0.0095, 0.019, and 0.040 mg a.i./L groups, respectively.

Terminal growth was not impaired in first-generation male mysids; however, length and dry weight of female mysids were significantly reduced 6% and 20% at the highest treatment level, 0.040-mg a.i./L level.

Based upon reproduction success data, the LOEC is 0.019 mg a.i./L, the NOEC is 0.0095 mg a.i./L, and the MATC is 0.013 mg a.i./L.

This study is classified as Core. It is acceptable and fulfills the US EPA guideline requirement for an aquatic invertebrate life-cycle test using the *Mysidopsis bahia* [§72-4(b)]

and generally complies with the recommendations outlined by OPPTS 850.1350 for a Mysid Chronic Toxicity Test.

Results Synopsis:
Survival
NOEC: 0.040 mg a.i./L
LOEC: >0.040 mg a.i./L

Reproduction
NOEC: 0.0095 mg a.i./L
LOEC: 0.019 mg a.i./L

Dry Weight (females)
NOEC: 0.019 mg a.i./L
LOEC: 0.040 mg a.i./L

Length (females)
NOEC: 0.019 mg a.i./L
LOEC: 0.040 mg a.i./L

Dry Weight (males)
NOEC: 0.040 mg a.i./L
LOEC: >0.040 mg a.i./L

Length (males)
NOEC: 0.040 mg a.i./L
LOEC: >0.040 mg a.i./L

8. ADEQUACY OF THE STUDY:

A. Classification: Core

B. Rationale: N/A

C. Repairability: N/A

9. GUIDELINE DEVIATIONS:

1. Second-generation mysids should have been maintained for at least 4 days to monitor survival, development, and behavior.

2. Following sexual maturity and identification, raw data collected on the survival of each test mysid should have been provided. The summary tables provided used combined-sex data for Day 28. On day 28, it was possible to derive the number of each sex from raw growth data tables.

3. Although the first-generation mysids were reportedly observed for abnormal behavior once daily during the study, the results of these findings (if any) were not described.

4. The general health of the parental brood stock was not described.

5. Periodic testing of the dilution water for pesticides, PCBs, and toxic metals was conducted, but the data were not provided.

6. It was not specified if the test chambers were covered during the study.

7. The quantity of live brine mysid fed to the mysids was not specified.

10. SUBMISSION PURPOSE: This study was submitted to provide information on the toxicity of RPA 407213 to the life cycle of mysid shrimp.

11. MATERIALS AND METHODS:

A. Test Organisms/Acclimation

Guideline Criteria	Reported Information
Species An estuarine mysid species, preferably *Americamysis bahia*	*Americamysis bahia*
Source/Supplier	In-house cultures. Brood stock were originally obtained from Aquatic BioSystems, Inc., Ft. Collins, CO.
Age at Beginning of Test <24 hours old	≤24 Hours old

Guideline Criteria	Reported Information
Parental Acclimation Parental stock must be maintained separately from the brood culture in dilution water and under test conditions. Mysids should be in good health.	During acclimation, parent mysids were maintained under test conditions. General health of the brook stock was not described.
Parental Acclimation Period At least 14 days	14 Days
Brood Stock Test started with mysids from: - one brood stock, or - brood stock which has not obtained sexual maturity or had been maintained for >14 days in a laboratory with same food, water, temperature, and salinity used in the test.	Mysids were obtained from brood stock maintained for 14 days under conditions similar to those employed in the definitive test.

B. Test System

Guideline Criteria	Reported Information
Source of Dilution Water May be natural (sterilized and filtered) or a commercial mixture; water must be free of pollutants.	Artificial seawater was prepared by the addition of a commercially-prepared salt formula (hw-MARINEMIX®) to soft, filtered (10-µm) freshwater. The artificial seawater was aerated vigorously for approximately 24 hours, then again for 24 hours prior to use. Generally, one batch was prepared weekly. Periodic testing of the dilution water for pesticides, PCBs, and toxic metals was conducted, but the data were not provided (p. 15).
Does water support test animals without observable signs of stress?	Yes
Water Temperature 27 ± 2°C for *A. bahia* mysids - At test termination, mean-measured temperature for each chamber should be within 1°C of selected test temperature. - Must be within 3°C of the mean of the time-weighted averages. - Must not differ by >2°C between chambers during the same interval.	Target: 25 ± 2°C Actual range: 23-27°C All criteria met.
Salinity 15-30 ‰ - The difference between highest and lowest measured salinities should be less than 5 ‰.	24-28 ‰ Criteria met.
pH 7.6-8.2	8.0-8.4
Dissolved Oxygen 60-100% saturation	6.2-7.4 mg O_2/L (equivalent to 86-107% saturation)

Guideline Criteria	Reported Information
Photoperiod 16-hr light/8-hr dark (14-hr light/10-hr dark also acceptable)	16-hr light/8-hr dark
Test Chambers 1. Material: All glass, No. 316 stainless steel, or perflorocarbon plastic 2. Size: Typically 30 x 45 x 15 cm (20.25 L) 3. Fill depth: 10 cm 4. Were chambers identical and covered during the test?	1. Glass 2. 39 x 20 x 25 cm (19.5-L) 3. From 5-9 cm (adjusted using a siphon) 4. All chambers were identical; it was not specified if the chambers were covered.
Test Compartments (within chambers) - 250-mL glass beakers with side cutouts covered with nylon mesh or stainless steel screen, or - 90- or 140-mm id glass Petri dish bottoms with collars made of 200-250 µm mesh screen	- Prior to pairing (on Day 14), mysids were maintained in 10-cm glass Petri dishes to which an approximately 15-cm high collar of Nitex screen was attached with silicone adhesive. - Following pairing, the reproductive compartments were cylindrical glass jars (5.1-cm diameter, 10-cm high) covered with Nitex screens.
Type of Dilution System Intermittent flow proportional diluters or continuous flow serial diluters should be used.	Intermittent-flow proportional diluter

Guideline Criteria	Reported Information
Toxicant Mixing 1. Mixing chamber is recommended but not required; aeration should not be used for mixing. 2. If a mixing chamber was not employed, was it demonstrated that the test solution was completely mixed before introduction into the test system? 3. Was flow splitting accuracy within 10%?	1. A single mixing chamber was employed; test solutions were not aerated. 2. N/A 3. N/A
Flow Rate 1. 5-10 volume additions per 24 hours. 2. Did the flow rate maintain the toxicant level and the DO at ≥60% of saturation? 3. Were the meter systems calibrated before study and checked twice daily during test period?	1. Approximately 7.2 volume additions/day 2. Yes 3. Yes
Solvents - Acceptable solvents include triethylene glycol, methanol, acetone, and methanol. - Solvent should not exceed 0.1 mL/L in a flow-through system.	N/A
Aeration Dilution water should be vigorously aerated, but the test tanks should not be aerated.	Dilution water was aerated but test tanks were not.

C. Test Design

Guideline Criteria	Reported Information
Duration of the Test Approximately 28 days. Was the test terminated within 7 days of the median time of first brood release in the controls?	28 Days No; test duration was adequate.
Nominal Concentrations Negative control, a solvent control (when applicable), and at least five treatment levels, one of which must adversely affect a life stage and one must not affect any life stage. The dilution factor should not be >50%.	Negative control, and 0.0015, 0.0029, 0.0028, 0.012, 0.023, and 0.047 mg a.i./L. Concentrations were adjusted for the purity of the test substance.
Distribution Number of mysids before pairing: Minimum of 15 mysids per compartment, 2 compartments per chamber, 2 chambers per concentration for a total of 60/treatment level. Number of mysids after pairing: ≥20 randomly selected pairs/treatment (excess males should be held in separate compartment in same treatment to replace paired males).	60/Level: 15/mysids per compartment, two compartments per chamber, and two replicate chambers per concentration. 20 pairs/Level: one pair per compartment, 10 compartments per chamber (theoretically), and two replicate chambers per concentration. Extra mysids were pooled into one of the original retention compartments within each chamber and maintained for the duration of the test. Paired males that died during the study were replaced with a male from the pooled group. Dead females were not replaced.
Pairing Should be conducted when most of the mysids are sexually mature, usually 10-14 days after test initiation. All pairing should occur on the same day.	All pairing was conducted on Day 14.

Guideline Criteria	Reported Information
Test organisms randomly or impartially assigned to test vessels?	Yes
Were treatments randomly assigned to individual test chamber locations?	Yes
Feeding Mysids should be fed live brine mysid nauplii at least once daily. 150 live brine shrimp nauplii per mysid per day or 75 twice a day is recommended.	Juvenile mysids were fed newly hatched live brine shrimp (*Artemia* sp.) nauplii generally twice a day (amount not specified). Prior to pairing, at least one feeding/day was enriched with Selco, a substance high in saturated fatty acids. Following pairing, the Selco encrichment was used on an every-other day basis.
Counts Live adult mysids should be counted at initiation, at pairing, and daily after pairing. Live young must be counted and removed daily. Missing or impinged animals should be recorded.	Live adult mysids were estimated once daily; precise determinations were made at test initiation, post-pairing, and test termination. After pairing, live young were counted once daily until test termination. Dead mysids were removed and recorded when observed.
Controls Negative control and carrier control (when applicable) are required.	A negative control was included.

Guideline Criteria	Reported Information
Water Parameter Measurements 1. Temperature should be monitored daily in one chamber and at least three times in all chambers. 2. Salinity should be measured daily in at least one test vessel. 3. pH should be measured at the beginning, the end, and at least weekly during the test in the control vessels and highest test level. 4. Dissolved oxygen must be measured at each concentration at least once a week.	Temperature, salinity, pH, and DO were measured daily in each replicate test and control chamber. Temperature was also monitored continuously in one control replicate.
Chemical Analysis Toxicant concentration must be measured in one chamber at each toxicant level every week.	Toxicant concentration was measured in alternating replicate chambers on Days 0, 7, 14, 21, and 28. Analysis was performed using HPLC in conjunction with UV (215 nm) detection. The LOQ was 0.00424 mg a.i./L.

Comments: First-generation mysids were observed daily for mortality and signs of abnormal behavior. Once daily during the reproduction period (Days 14-28), second-generation mysids were counted and discarded.

12. REPORTED RESULTS

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes

Guideline Criteria	Reported Information
Chemical Analysis For all test groups, a) the measured concentration of the test material should not be <50% of the time-weighted average measured concentration for >10% of the duration of the test, and b) the measured concentration should not be >30% of the time-weighted average measured concentration for >5% of the duration of the test.	All criteria met.
Controls - Survival of the paired first-generation controls must be ≥70%. - ≥75% of the paired first-generation female controls produced young, or - The average number of young produced by the first-generation female controls was ≥3.	All criteria met.
Data Endpoints Must Include 1. Survival of first-generation mysids, gender specified 2. Number of live young produced per female 3. Dry weight and length of each first generation mysid alive at the end of the test, gender specified **Data Endpoints Should Also Include** 4. Incidence of morphological findings. 5. Survival, development, and behavior of second-generation mysids for at least 4 days.	Data Endpoints Included 1. Survival of first generation mysids on Day 28 (combined sexes). 2. Criteria met. 3. Criteria met. 4. Not addressed in study Results and Discussion. 5. Apparently not performed.

Guideline Criteria	Reported Information
Raw data must include	
1. Survival of first-generation mysids, gender specified	1. Provided for Day 28; not differentiated by sex. Sex-specific survival for Day 28 was derived by the reviewer from raw terminal growth data tables.
2. Number of live young produced per female	2. Provided
3. Terminal weight and length measurements, individual and gender specified	3. Provided

Effects Data

Concentration (mg a.i./L)		Survival Day 28[a]			Reproduction, Days 14-28		Growth, Day 28[b]			
Nominal	Mean Measured (% nominal)	No. ♂	No. ♀	Percent (ratio) ♂ and ♀	Total No. of Young	Mean No. Young/ Female/Repro. Days	Mean Length, mm		Mean Dry Weight, mg	
							♂	♀	♂	♀
Control	—	25	27	87 (52/60)	555	1.92	8.5	8.7	1.1	1.4
0.0015	0.0014 (94)	26	25	85 (51/60)	524	1.78	8.6	8.6	1.1	1.4
0.0029	0.0027 (93)	25	24	82 (49/60)	532	1.86	8.4	8.7	1.0	1.6
0.0058	0.0052 (90)	18	33	85 (51/60)	520	1.76	8.4	8.6	1.0	1.5
0.012	0.0095 (79)	33	24	95 (57/60)	452	1.53	8.6	8.4	1.1	1.4
0.023	0.019 (84)	27	22	82 (49/60)	130	0.453*	8.5	8.6	1.0	1.5
0.047	0.040 (84)	29	19	80 (48/60)	2	0.0073*	8.3	8.2*	1.0	1.2*

[a]The number of surviving organisms/sex was reviewer-derived from raw terminal growth data tables. Only combined-sex data were evaluated statistically.
[b]Data for combined sexes was not analyzed statistically.
*Statistically significant from control at $p \leq 0.05$.

Toxicity Observations: First generation mysids were reportedly observed daily for abnormal appearance and behavior. No discussion of findings (if any) was provided.

B. Statistical Results:

Statistical Method: Data that were statistically analyzed included: (1) the number of first generation mysids surviving 28 days of exposure, (2) the number of young per surviving female per productive day (evaluated on Day 28), (3) the total length of surviving first generation mysids at the conclusion of the test, and (4) the dry weight of surviving first generation mysids at the conclusion of the test. No sublethal effects were reportedly observed, and this parameter was therefore not analyzed statistically. Mean organism responses were used in all calculations, and survival data were transformed (arcsine square-root percentage) prior to comparison.

Data were analyzed by standard statistical techniques using a computer program (West, Inc., and Gulley, 1994). The Shapiro-Wilk's Test was used to determine that data were normally distributed, and Bartlett's Test was used to determine that variances were homogeneous. For each endpoint, the performance of organisms exposed to each treatment level of the test substance was compared with the performance of the control using the Williams' or Dunnett's Test. Analyses were conducted at the 95% level of certainty, except for the Bartlett's Test, in which the 99% level of certainty was applied.

The NOEC is the highest tested concentration at which no measured biologcal parameter is statistically different ($\propto = 0.05$) from the controls. The LOEC is the lowest tested concentration at which any measured biological parameter is statistically different ($\propto = 0.05$) from the controls. The MATC is the geometric mean of the NOEC and the LOEC.

Most sensitive endpoint: Reproduction success (offspring/female/day)

Results Synopsis

Endpoint	Method	NOEL	LOEL	MATC
Survival	Williams' or Dunnett's	0.040 mg a.i./L	>0.040 mg a.i./L	N/D
Reproduction	Williams'	0.0095 mg a.i./L	0.019 mg a.i./L	0.013 mg a.i./L
Weight (dry)[a]	Williams'	0.019 mg a.i./L	0.040 mg a.i./L	N/D
Length[a]	Williams'	0.019 mg a.i./L	0.040 mg a.i./L	N/D

[a] NOEL, LOEL, and MATC reflect female results; no treatment-related effect was observed in male mysids.
N/D - Not determined.

13. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: The reviewer statistically verified the same parameters that were statistically analyzed by the study author: (1) the number of first generation mysids surviving 28 days of exposure, (2) the number of young per surviving female per productive day (evaluated on Day 28), (3) length and weight of male and female surviving first generation mysids at the conclusion of the test.

Parental survival was compared using Fisher's exact test. After confirming that variances for the number of offspring produced per live adult per day, terminal length, and weight were homogeneous and normally distributed, they were compared using ANOVA, followed by Dunnett's and William's tests via TOXSTAT software to determine the NOEC and LOEC values.

Most sensitive endpoint: Reproduction success (offspring/female/day)

Results Synopsis

Endpoint	Method	NOEL	LOEL
Survival	Student's t-Test	0.040 mg a.i./L	>0.040 mg a.i./L
Reproduction	Williams'/Dunnett's	0.0095 mg a.i./L	0.019 mg a.i./L
Weight (dry)[a]	Williams'/Dunnett's	0.019 mg a.i./L	0.040 mg a.i./L
Length[a]	Williams'/Dunnett's	0.019 mg a.i./L	0.040 mg a.i./L

[a] NOEL, LOEL, and MATC reflect female results; no treatment-related effect was observed in male mysids.

14. REVIEWER'S COMMENTS:

The reviewer's conclusions were identical to the study author's.

Deviations in this study were the failure to report information, which did not impact the acceptability or the validity of this study.

Three quality control (QC) samples containing RPA 407213 were also prepared at each sampling interval, and remained with the set of collected dilution water test samples throughout the analytical process (p. 20). Results are presented in Table 2, p. 30. Recoveries were generally within an acceptable limits, ranging from 98.3 to 110% of the nominal. However 1/3 sample recoveries fell slightly outside acceptable limits on Day 21 (117% of nominal) and Day 28 (77.8%).

This study was conducted in accordance with USEPA Good Laboratory Practice Standards and included a Quality Assurance Statement.

15. REFERENCES:

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16. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Adult Survival

```
     Standard Two-Sample t-Test

data:  x: V1 in DS1 , and y: V2 in DS1
t = 0.2425, df = 2, p-value = 0.831
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -8.370146  9.370146
sample estimates:
 mean of x mean of y
        26      25.5
     Standard Two-Sample t-Test

data:  x: V1 in DS1 , and y: V3 in DS1
t = 0.124, df = 2, p-value = 0.9126
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -16.84455  17.84455
sample estimates:
 mean of x mean of y
        26      25.5


     Standard Two-Sample t-Test

data:  x: V1 in DS1 , and y: V4 in DS1
t = 0.2, df = 2, p-value = 0.86
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -10.25663  11.25663
sample estimates:
 mean of x mean of y
        26      25.5

     Standard Two-Sample t-Test

data:  x: V1 in DS1 , and y: V5 in DS1
t = -1.2127, df = 2, p-value = 0.3491
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -11.370146   6.370146
sample estimates:
 mean of x mean of y
        26      28.5

     Standard Two-Sample t-Test

data:  x: V1 in DS1 , and y: V6 in DS1
t = 0.6, df = 2, p-value = 0.6094
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
  -9.256632  12.256632
sample estimates:
 mean of x mean of y
        26      24.5

     Standard Two-Sample t-Test
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data:  x: V1 in DS1 , and y: V7 in DS1
t = 0.5547, df = 2, p-value = 0.6349
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -13.51344  17.51344
sample estimates:
 mean of x mean of y
        26        24
```

Reproductive Success

Average number of young/female/reproductive day
File: 5723y Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	7.152	1.192	31.368
Within (Error)	7	0.263	0.038	
Total	13	7.416		

Critical F value = 3.87 (0.05,6,7)
Since F > Critical F REJECT Ho:All groups equal

Average number of young/female/reproductive day

File: 5723y Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	1.924	1.924		
2	0.0014	1.779	1.779	0.748	
3	0.0027	1.853	1.853	0.368	
4	0.0052	1.760	1.760	0.843	
5	**0.0095**	**1.533**	**1.533**	**2.006**	
6	0.019	0.451	0.451	7.557	*
7	0.04	0.007	0.007	9.835	*

Dunnett table value = 2.82 (1 Tailed Value, P=0.05, df=7,6)

Average number of young/female/reproductive day
File: 5723y Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	2			
2	0.0014	2	0.550	28.6	0.146

3	0.0027	2	0.550	28.6	0.072
4	0.0052	2	0.550	28.6	0.164
5	0.0095	2	0.550	28.6	0.391
6	0.019	2	0.550	28.6	1.473
7	0.04	2	0.550	28.6	1.917

Average number of young/female/reproductive day
File: 5723y Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	2	1.924	1.924	1.924
2	0.0014	2	1.779	1.779	1.816
3	0.0027	2	1.853	1.853	1.816
4	0.0052	2	1.760	1.760	1.760
5	0.0095	2	1.533	1.533	1.533
6	0.019	2	0.451	0.451	0.451
7	0.04	2	0.007	0.007	0.007

Average number of young/female/reproductive day
File: 5723y Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	1.924				
0.0014	1.816	0.561		1.89	k= 1, v= 7
0.0027	1.816	0.561		2.00	k= 2, v= 7
0.0052	1.760	0.847		2.04	k= 3, v= 7
0.0095	**1.533**	**2.016**		**2.06**	**k= 4, v= 7**
0.019	0.451	7.594	*	2.07	k= 5, v= 7
0.04	0.007	9.884	*	2.08	k= 6, v= 7

s = 0.194
Note: df used for table values are approximate when v > 20.

Male length

male length
File: 5723ml Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.157	0.026	1.625
Within (Error)	7	0.115	0.016	

Total	13	0.272

Critical F value = 3.87 (0.05,6,7)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

male length
File: 5723ml Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	8.500	8.500		
2	0.0014	8.600	8.600	-0.791	
3	0.0027	8.450	8.450	0.395	
4	0.0052	8.400	8.400	0.791	
5	0.0095	8.550	8.550	-0.395	
6	0.019	8.500	8.500	0.000	
7	0.04	8.250	8.250	1.976	

Dunnett table value = 2.82 (1 Tailed Value, P=0.05, df=7,6)

male length
File: 5723ml Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	2			
2	0.0014	2	0.357	4.2	-0.100
3	0.0027	2	0.357	4.2	0.050
4	0.0052	2	0.357	4.2	0.100
5	0.0095	2	0.357	4.2	-0.050
6	0.019	2	0.357	4.2	0.000
7	0.04	2	0.357	4.2	0.250

male length
File: 5723ml Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	2	8.500	8.500	8.550
2	0.0014	2	8.600	8.600	8.550
3	0.0027	2	8.450	8.450	8.475
4	0.0052	2	8.400	8.400	8.475
5	0.0095	2	8.550	8.550	8.475
6	0.019	2	8.500	8.500	8.475
7	0.04	2	8.250	8.250	8.250

male length
File: 5723ml Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	8.550				
0.0014	8.550	0.390		1.89	k= 1, v= 7
0.0027	8.475	0.195		2.00	k= 2, v= 7
0.0052	8.475	0.195		2.04	k= 3, v= 7
0.0095	8.475	0.195		2.06	k= 4, v= 7
0.019	8.475	0.195		2.07	k= 5, v= 7
0.04	8.250	1.950		2.08	k= 6, v= 7

s = 0.128
Note: df used for table values are approximate when v > 20.

Female length

female length
File: 5723fl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.367	0.061	5.083
Within (Error)	7	0.085	0.012	
Total	13	0.452		

Critical F value = 3.87 (0.05,6,7)
Since F > Critical F REJECT Ho:All groups equal

female length
File: 5723fl Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	8.650	8.650		
2	0.0014	8.550	8.550	0.913	
3	0.0027	8.650	8.650	0.000	
4	0.0052	8.650	8.650	0.000	
5	0.0095	8.400	8.400	2.282	
6	**0.019**	**8.650**	**8.650**	**0.000**	
7	0.04	8.200	8.200	4.108	*

Dunnett table value = 2.82 (1 Tailed Value, P=0.05, df=7,6)

female length
File: 5723fl Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	2			
2	0.0014	2	0.309	3.6	0.100
3	0.0027	2	0.309	3.6	0.000
4	0.0052	2	0.309	3.6	0.000
5	0.0095	2	0.309	3.6	0.250
6	0.019	2	0.309	3.6	0.000
7	0.04	2	0.309	3.6	0.450

female length
File: 5723fl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	2	8.650	8.650	8.650
2	0.0014	2	8.550	8.550	8.617
3	0.0027	2	8.650	8.650	8.617
4	0.0052	2	8.650	8.650	8.617
5	0.0095	2	8.400	8.400	8.525
6	0.019	2	8.650	8.650	8.525
7	0.04	2	8.200	8.200	8.200

female length
File: 5723fl Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	8.650				
0.0014	8.617	0.303		1.89	k= 1, v= 7
0.0027	8.617	0.303		2.00	k= 2, v= 7
0.0052	8.617	0.303		2.04	k= 3, v= 7
0.0095	8.525	1.134		2.06	k= 4, v= 7
0.019	**8.525**	**1.134**		**2.07**	**k= 5, v= 7**
0.04	8.200	4.084	*	2.08	k= 6, v= 7

s = 0.110
Note: df used for table values are approximate when v > 20.

Male weight

male weight
File: 5723mw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.010	0.002	0.500
Within (Error)	7	0.025	0.004	
Total	13	0.034		

Critical F value = 3.87 (0.05,6,7)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

male weight
File: 5723mw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	1.050	1.050		
2	0.0014	1.075	1.075	-0.395	
3	0.0027	1.035	1.035	0.237	
4	0.0052	1.025	1.025	0.395	
5	0.0095	1.085	1.085	-0.553	
6	0.019	1.030	1.030	0.316	
7	0.04	1.005	1.005	0.712	

Dunnett table value = 2.82 (1 Tailed Value, P=0.05, df=7,6)

male weight
File: 5723mw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	2			
2	0.0014	2	0.178	17.0	-0.025
3	0.0027	2	0.178	17.0	0.015
4	0.0052	2	0.178	17.0	0.025
5	0.0095	2	0.178	17.0	-0.035
6	0.019	2	0.178	17.0	0.020
7	0.04	2	0.178	17.0	0.045

male weight
File: 5723mw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	2	1.050	1.050	1.063
2	0.0014	2	1.075	1.075	1.063
3	0.0027	2	1.035	1.035	1.048
4	0.0052	2	1.025	1.025	1.048
5	0.0095	2	1.085	1.085	1.048
6	0.019	2	1.030	1.030	1.030

7	0.04	2	1.005	1.005	1.005

male weight
File: 5723mw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	1.063				
0.0014	1.063	0.211		1.89	k= 1, v= 7
0.0027	1.048	0.028		2.00	k= 2, v= 7
0.0052	1.048	0.028		2.04	k= 3, v= 7
0.0095	1.048	0.028		2.06	k= 4, v= 7
0.019	1.030	0.337		2.07	k= 5, v= 7
0.04	1.005	0.758		2.08	k= 6, v= 7

s = 0.059
Note: df used for table values are approximate when v > 20.

Female Weight

female weight
File: 5723fw Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	6	0.199	0.033	6.600
Within (Error)	7	0.033	0.005	
Total	13	0.232		

Critical F value = 3.87 (0.05,6,7)
Since F > Critical F REJECT Ho:All groups equal

female weight
File: 5723fw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	1.440	1.440		
2	0.0014	1.420	1.420	0.283	
3	0.0027	1.550	1.550	-1.556	
4	0.0052	1.490	1.490	-0.707	
5	0.0095	1.375	1.375	0.919	
6	**0.019**	**1.470**	**1.470**	**-0.424**	
7	0.04	1.150	1.150	4.101	*

Dunnett table value = 2.82 (1 Tailed Value, P=0.05, df=7,6)

female weight
File: 5723fw Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	2			
2	0.0014	2	0.199	13.8	0.020
3	0.0027	2	0.199	13.8	-0.110
4	0.0052	2	0.199	13.8	-0.050
5	0.0095	2	0.199	13.8	0.065
6	0.019	2	0.199	13.8	-0.030
7	0.04	2	0.199	13.8	0.290

female weight
File: 5723fw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	control	2	1.440	1.440	1.475
2	0.0014	2	1.420	1.420	1.475
3	0.0027	2	1.550	1.550	1.475
4	0.0052	2	1.490	1.490	1.475
5	0.0095	2	1.375	1.375	1.423
6	0.019	2	1.470	1.470	1.423
7	0.04	2	1.150	1.150	1.150

female weight
File: 5723fw Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
control	1.475				
0.0014	1.475	0.508		1.89	k= 1, v= 7
0.0027	1.475	0.508		2.00	k= 2, v= 7
0.0052	1.475	0.508		2.04	k= 3, v= 7
0.0095	1.423	0.254		2.06	k= 4, v= 7
0.019	**1.423**	**0.254**		**2.07**	**k= 5, v= 7**
0.04	1.150	4.208	*	2.08	k= 6, v= 7

s = 0.069
Note: df used for table values are approximate when v > 20.